

REMARKS

Claims 1 and 5 are pending in the instant application. Claim 1 has been amended to indicate that the silica containing composite oxides are produced by simultaneously adding an alkali metal silicate and an alkali soluble inorganic oxide to an alkali aqueous solution. Support for the amendment can be found at page 5, lines 18-24 and page 6, lines 3-6 of the specification.

Reconsideration is respectfully requested in light of the above amendment of claim 1 taken with the following remarks.

35 U.S.C. § 112 Rejection

Claims 1 and 5 stand rejected under 35 U.S.C. § 112, first paragraph, as the Examiner suggests that it is unclear where the specification supports silica containing composite oxides formed by addition of an inorganic oxide. At page 5, lines 5-24 of the specification, Applicants disclose a number of inorganic oxides other than silica. At page 6, lines 9-15 of the specification, Applicants disclose producing silica containing composite oxides by dispersing seed particulates of silica and inorganic oxides in an alkali aqueous solution. Reading the disclosure at pages 5 and 6 together, it is readily apparent that the inorganic compound disclosed at page 6, lines 3-6 of the specification can be an inorganic oxide as disclosed at page 6, lines 9-15, as an inorganic oxide is a disclosed species of inorganic compound.

Thus, the amendment does not add any new matter and the rejection of claims 1 and 5 under 35 U.S.C. § 112, first paragraph should be withdrawn.

35 U.S.C. § 103 Rejection

Claims 1 and 5 stand rejected under 35 U.S.C. § 103(a) for purported obviousness over WO 95/33787 in view of United States Patent No. 5,316,714 to Yoneda et al. (hereinafter "Yoneda"). The Examiner suggests that a skilled artisan would have reasonably expected the formation of glycol sols surface modified with the silanes of Yoneda would have produced stable sols upon reading WO 95/33787 in view of Yoneda. Applicants respectfully disagree.

The present invention is directed to an inorganic compound sol including a dispersion medium having a dielectric constant of from 10 to 85 and, dispersed therein, inorganic compound particulates having average particle size from about 11 to 30 nm whose surface has been modified by an organic compound selected from vinylsilane compounds, acrylsilane compounds, epoxysilane compounds, aminosilane compounds, γ -mercaptopropyltrimethoxysilane and γ -chloropropyltrimethoxysilane, exhibiting a molecular polarizability of from 2×10^{-40} to $850 \times 10^{-40} \text{ C}^2\text{m}^2\text{J}^{-1}$. The organic compound particulates are composite oxide particulates composed of silica and at least one inorganic oxide other than silica, with the weight ratio of silica to at the least one inorganic oxide other than silica being 3 to 500. The silica containing composite oxides are produced by simultaneously adding an alkali metal silicate and an alkali soluble inorganic oxide to an alkali aqueous solution. The inorganic compound sol is stable in the presence of species selected from the group consisting of ionic components, salts and surfactants.

WO 95/33787 discloses a thermoplastic that contains specified fine particles of composite oxide including silica, alkali metal oxide, and at least one inorganic oxide other than silica.

Yoneda discloses a monodispersed glycol suspension that includes a monodispersed suspension in a glycol of spherical fine particles of an amorphous inorganic oxide containing glycol bonded to its surface.

In WO 95/33787, the thermoplastic resin film contains 0.005 to 20 weight % of fine particles of composite oxide comprising silica, alkali metal oxide and at least one inorganic oxide other than silica or alkali metal oxide, which satisfies the following expression of inequality (I) :

$$S \geq 7,200/(D_p \cdot SG) \quad (I)$$

where S indicates the specific surface area (m^2/g) of the fine particles of composite oxide, D_p indicates the average diameter (nm) of the fine particles, and SG indicates the true specific gravity thereof.

WO 95/33787 further described that the surface of the colloidal particle may be modified with a modifier such as an alkoxide compound such as tetraethoxy silane, triisopropoxy aluminum; a coupling agent such as a silane coupling agent and a titanium coupling agent; a low molecular or a high molecular surface-active agent such as a nonionic base, a cationic base, and an anionic base; and metal soap salt or the like such as metal salt of fatty acid and metal salt of naphthenic acid to improve the compatibility with the resin.

However, in WO 95/33787, an organic compound, which is selected from vinylsilane compounds, acrylsilane compounds, epoxysilane

compounds, aminosilane compounds, γ -mercaptopropyltrimethoxysilane and γ -chloropropyltrimethoxysilane, exhibiting a molecular polarizability of 2×10^{-40} to $850 \times 10^{-40} \text{ C}^2\text{m}^2\text{J}^{-1}$, is not disclosed.

First of all, WO 95/33787 aims at raising the lipophilicity of an inorganic particle and raising the affinity with a thermoplastic resin.

On the other hand, the present invention provides particulates that are always able to be stably dispersed in sol or solution even if acids, alkalis or surfactants are present. As a result, for example, the inorganic sol of the present invention is useful as cement additives to provide water stop or soil strength. When the inorganic sol of the present invention is added to cement, excessively quick caking of cement is retarded because of a low gelation rate, and the inorganic compound sol can easily fill up crevices between the solid and holes. For this purpose, the specific compound modifies the surface of the particulate in sol in accord with the present invention.

In WO 95/33787, the particles are made hydrophobic so that they are more compatible with thermal plastic resins, whereas in the present invention, the particles are made hydrophilic so that they can be dispersed in polar continuous phases, such as water. Supporting technical arguments to point out the structural and chemical differences between the particles and the materials that are used to coat the particles should further support our contention that the particles in WO 95/33787 are fundamentally different than those disclosed in the present invention.

WO 95/33787 does not disclose or suggest the technical idea of obtaining a stable inorganic sol. Furthermore, WO 95/33787 does not disclose the technical concept of the organic compound and the solvent.

As described in WO 95/33787, simply modifying particulates using common modifiers does not necessarily provide particulates that have excellent stability in sol or solution in the presence of acids, alkalis or surfactants.

Therefore, the present invention is clearly distinguished from WO 95/33767.

As discussed above, in WO 95/33787, the particles are made hydrophobic so that they are more compatible with thermal plastic resins, whereas in the present invention, the particles are made hydrophilic so that they can be dispersed in polar continuous phases, such as water. Thus, the structural and chemical differences between the particles and the materials that are used to coat the particles in WO 95/33787 are fundamentally different than those disclosed in the present invention.

WO 95/33787 does not teach the particular silane coupling agent of the present invention. Yoneda discloses numerous coupling agents including those used in the present invention. However, Yoneda does not teach or suggest the specific selection of the coupling agent having the specific molecular polarizability.

There is no disclosure in Yoneda to make the hydrophobic particles disclosed in WO 95/33787 hydrophilic as in the present invention. Because there is no suggestion, teaching or motivation in the combination of WO 95/33787 to

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Yoneda that would lead one skilled in the art to make the claimed inorganic compound sol, the claims are not obvious over the cited prior art.

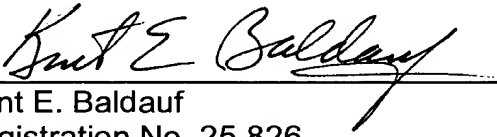
For the reasons stated above, the rejection of claims 1 and 5 under 35 U.S.C. § 103(a) over WO 95/33787 in view of Yoneda should be withdrawn.

CONCLUSION

In view of the above, it is submitted that the claims, as amended, are patentable over the prior art of record and are in condition for allowance.

Reconsideration of the rejections and allowance of claims 1 and 5 are respectfully requested.

Respectfully submitted,

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